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ABSTRACT

The research reported in this paper quantifies the impact of federal aid in the financing of local public schools. The specific question addressed is: What is the dollar-for-dollar response of state aid disbursements to the flow of federal aid dollars? The first section of the paper briefly considers the incentive created by existing federal aid flows when they are viewed as intergovernmental grants. To estimate the response to these incentives, a set of equations explaining interstate variations in state school aid to local school districts is used. The data used are for all states for the 1973-74 through 1975-76 school years. The statistical results are presented in the second section. The final section discusses policy issues and the need for further research. Statistical equations and detailed data sources are included in two appendixes. Three tentative conclusions are drawn: that federal categorical aid for specified purposes and populations is stimulative of additional state disbursements of general and categorical aid; that federal impact aid affects state aid in a negative way; and that other socioeconomic and demographic variables are important determinants in the amount of state aid distributed for school services. (Author/IRT)

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WORKING PAPERS IN EDUCATION FINANCE

Working Paper No. 24

THE IMPACT OF FEDERAL AID ON THE DISTRIBUTION OF STATE AID

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CONTENTS

INTRODUCTION..... 1

EFFECTS OF FEDERAL AID..... 3

DATA EQUATIONS AND RESULTS..... 10

CONCLUSIONS AND POLICY IMPLICATIONS..... 17

APPENDIX A: STATISTICAL EQUATIONS..... 25

APPENDIX B: DATA SOURCES..... 33

REFERENCES..... 35

INTRODUCTION

Since the mid-1960s, the federal role in the financing of local public schools has significantly increased in the number of dollars and proliferation of programs. Yet, the nature of the financing role has remained stable. Its primary concern has been to increase the flow of funds to specially targeted populations. The federal share of the total dollars used to finance public schools stabilized in the late 1960s, at about eight percent. Its total impact, however, is likely to be much greater if the potential stimulus of state own-source spending in these programs is considered.

The intent of the research reported in this paper is to begin to quantify that impact. It is clear that states have implemented their own programs for the target groups enumerated by the federal government. Although the bulk of state aid is general operating aid, categorical aids, during the 1970s, at the state level have expanded to cover nearly all populations included under federal laws. For example, 17 states spent $364 million in fiscal year 1976 on compensatory education programs; in the first half of the 1970s, most states passed or strengthened legislation and dramatically increased their funding for the handicapped.

Yet, the specific question addressed by this study is what is the dollar for dollar response of state aid disbursements to the flow of federal aid dollars? That is, how do states react in terms of their provision of school aid to local districts, when the federal government distributes money to them and/or to local districts? Most federal aid programs carry with them strict statements against supplementation of state or local funds for federal dollars. With

the proliferation of income sources for local entities, however, these restrictions can become difficult to track. The question is, then, do states actually supplement federal funds with their own, and if so, what is the magnitude of this response?

This question is pertinent in terms of policy issues the federal government is currently confronting, with respect to its role in the financing of public schools. Several aspects are being considered. What consolidation, if any, can be made of the numerous programs aimed at special populations? Should the structure of this aid be changed from strict categorical programs to general aid more along the lines of state aid programs? How do either of these changes fit with the potential role of the federal government in intrastate and interstate school finance reform?

The state's response to the existing federal role in terms of the intergovernmental aid given to school districts is important information in the context of the above questions. It is also important in light of the stricter tax and/or expenditure limitations that may evolve nationwide. The total revenue available to states for local education services, as well as other public services, may be restricted. This would require a careful examination of the priorities of various services provided. The incentives that the federal government can and does create with the flow of intergovernmental dollars of aid to the states and local school districts should be critically considered.

The first section of this paper will briefly consider the incentives created by existing federal aid flows when they are viewed as intergovernmental grants. This is done in the context of the

existing theoretical and empirical literature on similar studies. To estimate the response to these incentives, a set of equations explaining interstate variations in state school aid to local school districts is used. The data used are for all states for the 1973-74, 1974-75, 1975-76 school years -- years for which complete data sets are available. The statistical results are presented in the paper's second section. The final section discusses policy issues and the need for further research. Statistical equations and detailed data sources are included in Appendices A and B.

EFFECTS OF FEDERAL AID

Earlier studies of the effect or impact of federal aid differ from the present study in either of two ways: (1) they are studies of the determinants of state plus local expenditures or (2) they are studies of total state expenditures on services regardless of whether these expenditures are direct or constitute an intergovernmental grant. The present study is concerned specifically with the effect of federal aid on the states' disbursement of school aid, both general and categorical, to local districts. The approach used is a statistical analysis of variations in the states' expenditures on school aid as well as the variations in state plus federal school aid. The variables and results of earlier studies on the determinants of state-local expenditures are therefore pertinent.

A summary of numerous expenditure-determinant studies is provided by Gramlich (1969, pp. 569-92). As he notes, an earlier study by Brazer (1959) had discovered that federal grants "worked" in equations explaining state and local expenditures, and a number of

studies had subsequently dealt more specifically with their effects.

Gramlich reports that a majority of the more reliable studies indicate the effect of federal aid is highly stimulative. Indeed, over half of these studies indicate an amount of state-local effort that extends beyond the legal matching ratio of the federal grant* -- an unexpected response, theoretically. Gramlich calls this a "complementary effect" in the sense that the federal grant complements other state spending programs, and the state responds by spending more than is legally required. For example, if the state is required to spend, in total, $1.50 for every dollar of federal aid and it spends $2.00, this is termed a complementary effect; if it spends $1.25, this is termed stimulative, but not complementary. When there is no legal requirement that states continue to spend what they were before the federal grant, there is this potential for substitution and the effect of the grant may be less than what the matching provisions dictate.

These comments are all in the context of federal grants which have specific matching requirements and for areas in which the state is already making its own expenditures. If the state is not spending in a certain area, it is difficult for the state to substitute grant money for expenditures it was already planning. The response to

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*Gramlich uses the term "matching ratio" to denote the legal rate at which the state or locality is required to spend as a condition of its receipt.

This is to be distinguished from the "matching rate" of an open-ended matching grant which makes the amount of aid received by the locality a direct function of their own effort over the range of potential expenditure levels.

grants is likely to be stimulative. Indeed, evidence summarized by Barro (1978) indicates that most federal, closed-ended grants were fully used by states and states spent more of their own funds in most functional areas than were required to match federal funds. He notes this as evidence that federal aid was often made available for activities that might not have otherwise been supported by the state.

This is more descriptive, perhaps, of the grants to the states, in the area of education, for specially targeted pupil populations. For the particular years analyzed in this study, the states were initiating many new programs to serve the various groups. Analysis of education expenditures as a separate function by Osman (1966, pp. 362-372) indicated a high degree of stimulation of state-local education expenditures in response to federal aid. State-local expenditures on local schools were estimated to increase by $2.71 for each dollar of federal aid. Another interesting finding is that federal aid to functions other than education were associated with a $0.52 increase in education expenditures (Osman, p. 367). This indicates that funds are "freed up" from other functions once they are aided and/or that education is complementary to other functions. That is, increases in expenditures on certain functions lead to added outlays on functions complementary to these -- which must include education services.

A recent and pertinent study by Feldstein (1978) specifically analyzes the effect of Title I on local education spending. A critical point made by Feldstein is that these federal aid flows constitute a unique type of intergovernmental grant which is more stimulative than a traditional bloc grant. His study indicates that

since these differential add-on grants require an observable differential of spending levels on subgroups of the population, they are more effective per dollar of federal aid in increasing local spending. Feldstein suggests that traditional theory of intergovernmental aid should be broadened to recognize this type of grant (1978, p. 443).

Other than federal aid variables, these earlier studies included estimates of the impact of several socioeconomic and taste variables on state and local expenditures. A proliferation of these have been used. A study by Barro (1972) of school district expenditures aggregated to the state level is the most relevant for identifying such variables for the present study. Taste variables tested by Barro included population density, urbanization, education level of the adult population and the geographic region of the states' location. These were in addition to three primary variables -- income, grants-in-aid and a price variable to reflect the relative price of education services in each state.

Only some of the taste variables proved to be significant. The density variable indicated that schools in sparsely populated states incur higher expenditures, either due to diseconomies of small scale, or high costs of pupil transportation. The regional variable indicated that southern school districts tended to spend less per pupil, on average, but their spending appeared more responsive to levels of state and federal grants.

Barro's results on the income, grants and price variables were as expected. The income of the state, measured by income per capita, has a positive impact on the district's willingness to impose higher

taxes for spending on education. Approximately $.05 in increased school spending occurs with each dollar increase in per capita income. This income effect is not as strong as the impact of an increase in state and federal aid; districts tend to increase spending per pupil for each dollar of aid by approximately $0.31. Recall that this study measured the response of local district spending to state and federal aids, not a state spending response.

A unique and important aspect of Barro's study is his attempt to include a price variable in his analysis. This price variable is really the ratio of two price indices. One price index reflects the relative costs of education inputs (teachers, materials, etc.) among states. The other price index simply reflects the relative cost of living among the states. The ratio of these two is an indicator, then, of the price of education relative to the price of all other goods for each state. The higher this price, the lower are the expenditures of districts in that state; which confirms the expected relationship (1972, p. 11). Barro notes that the use of this price variable in the equations is important to the stability of his results across the nine years studied; this was lacking in the studies covered by Gramlich (1972, p. 12).

Several conclusions from these studies are important for the present analysis. First, the effect of federal aids on state and local spending has been found generally stimulative. Indeed, the findings are higher than might be expected theoretically. Second, the use of federal aid, income and socioeconomic variables explain a significant proportion of the variation in state expenditures. Finally, Barro's study of school district expenditures identifies

variables specific to the variations in education spending; variables that are included in the present study.

As Barro notes, there is a drastic amount of improvement that needs to be made in the statistical analysis of these studies to date. The discrepancies between cross-sectional and time serious results needs to be confronted (1978, p. 138), interstate variations in the costs of public services need to be measured and the structure of federal aid (matching v. nonmatching, etc.) should be explicitly treated in the analysis. Along conceptual lines, he calls for improvement in information on (1) the effect of federal aid on levels of direct spending, state intergovernmental aid and state taxes; (2) the differential effect of federal "pass-through"* funds and aid for state-operated programs; and (3) the effect of federal aid to local districts on the distribution of state aid. The present study begins to address two of these conceptual areas. It uses intergovernmental aid as the dependent variable and includes federal aid to the local district as one of the independent variables. Future research should broaden the analysis by using several equations and the separation of "pass-through" funds from direct aid to the states.**

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*Pass-through funds refer to the dollars of aid which originate at and are financed by the federal sector and then distributed by state governments to the recipient localities.

**The independent variable, federal revenue distributed to the state education agencies, includes those funds for state operated programs and aid to be distributed to local school districts. These are estimated by the Advisory Commission for Intergovernmental Relations (ACIR) as approximately half of the funds distributed to states for education (ACIR, p. 22).

The questions that remain for the present study concern the structure of federal aid flows and what incentives are created for the states' spending decisions? The basic tenet behind federal aid to the states for education services is that it should supplement state and local expenditures. Although there are not strict matching requirements involved, there are allocation requirements and strong statements that federal funds must "supplement and not supplant" state and local money. There are often requirements about the provision of a program, or disbursement of state aids for specific programs that accompany the receipt of federal funds. The grants from the federal government are primarily categorical, nonmatching and limited in nature. Title I and ESEA programs, for instance, are aimed at particular groups of students and programs. They are nonmatching in the sense that the state actions in terms of expenditures do not directly affect the amount of aid received. A number of the programs are limited in total dollar amount by the budget constraint of the federal government.

A peculiarity of these federal aid flows and subsequent difficulty for this analysis is that they vary as to the primary recipient of the dollars. Some programs, such as federal impact aid, flow directly to the local education agency (LEA). Funds distributed under Title I are channeled through the state education agency (SEA) first, after the formula calculations on a countywide basis are made. Not only does the state then "pass-through" these funds, but most states have their own compensatory programs and/or "weightings" in their general aid program for Title I eligible or low income pupils. With the data available, it is difficult, to be sure the

"pass-through" element is separated from the state's categorical or general aid spending. It is difficult, then, to determine the response of the states' own effort.*

The incentives created by the federal grant structure are analogous to increases in income for the states and local communities. They are conditional increases in income, in the sense that states are required to spend them in specific program areas. Furthermore, these programs are likely to be areas in which the state was not previously spending at significant levels. For these reasons as well as results of other state determinant studies, it is expected that federal aid may have a stimulative effect on the states' spending on aid to local school districts.

DATA EQUATIONS AND RESULTS

The data used in the analysis are for the 50 states and cover school years 1973-74 through 1975-76.** The revenue data are combined from several sources;*** this is due to, and affected by,

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*The data on state intergovernmental aid and federal aid received by local districts are taken from National Center for Education Statistics' publications. These data are derived from surveys and should be "clean" in the sense that states are asked to report only state-financed aid distributions, and the receipt of direct federal grants by local school districts.

**The data set originally proposed for use in the present analysis is the universal school district finance and expenditure tape compiled for NCES by the Bureau of the Census. This tape is not yet available but will be used for future analyses in this area.

***For a complete description of data and sources, see Appendix B.

the problems of tracking sources of aid to their true origins.* Other data such as personal income, percent urban population, population and percent population were derived from several Census publications and the Survey of Current Business. Data on sales and income tax revenue and noneducation federal revenues were also obtained from Census publications.

The equations presented in Tables A-1 through A-3 of Appendix A include most of the variables mentioned. The equations exhibit an acceptable amount of explained variation, and the variable coefficients are generally significant and of the expected sign. The results are fairly stable across the three school years analyzed.

The results indicate that federal aid distributed to SEAs is highly stimulative in terms of increased intergovernmental aid to school districts. Aid distributed directly to LEAs from the federal government also appears to stimulate increased state level aid disbursements. Results on federal impact aid, however, are consistently negative, indicating states may reduce their dollars of general and categorical aid as the federal government distributes dollars to districts impacted by federal installations.

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*A discussion of this problem is presented in the States and Intergovernmental Aids, ACIR, A-59, Feb. 1977, Washington, D.C. (pp. 14-23).

MEAN DOLLAR EFFECTS* OF FEDERAL AID
ON STATE DISBURSEMENT OF AID
TO LOCAL SCHOOL DISTRICTS

	1973-74	1974-75	1975-76
Federal Revenue to SEA	$2.34**	$2.24**	
Federal Revenue to LEA	N.S.	N.S.	$2.50*
Federal Impact Aid	-4.00**	-2.50**	N.S.
	Real Dollar Terms***		
Federal Revenue to SEA	$2.19**	$2.34**	$1.85**
Federal Revenue to LEA	N.S.	1.35**	1.75**
Federal Impact Aid	-5.00**	-4.04**	N.S.

*These mean dollar effects are derived from the elasticities in Tables A-1 through A-6 and the sample means. For example, the elasticity of state aid per pupil with respect to federal aid to the SEAs equaled .757 in 1973-74 (see Table A-1). That is, a 1 percent change in federal aid per pupil is related to a .757 percent change in state aid per pupil. At the mean for the states, this translates into a $3.81 increase in state aid per pupil with a $1.63 receipt in federal aid per pupil, or $2.34 of state aid for every dollar of federal aid.

**Only significant coefficients presented.

***The results in Table 1 for adjusted dollar values are derived from Tables A-4 through A-6. They are deflated by estimates of the relative cost of living for the 50 states. This index was created using data from the Bureau of Labor Statistics on cost-of-living differences implied by budgets for urban families.

N.S. = Not statistically significant in the state equation for that year.

For the 1973-74 and 1974-75 data sets, the impact of a dollar of federal aid on state own spending is approximately $2 per pupil. That is, total spending (state and federal) on aid is approximately $3 per pupil for every dollar of federal aid received by the states in these two years. Either through their own spending for state categorical aid programs or distribution of general state equalizing aid, it appears the states are supplementing dollars of federal aid. The coefficient on federal categorical aid received by LEAs was insignificant in explaining state aid disbursement in two of the three years analyzed.

The coefficient and dollar effect of federal impact aid to LEAs is negative in all years analyzed. The elasticity estimates imply that states reduce state aid to LEAs by as high an amount as $5 for every dollar of aid to impacted areas. The specific dollar amount should not be emphasized until further research is available, but the present results are robust in the implied direction of this effect. Some states do appear to take into account the distribution of federal dollars to districts under this program and, in response, reduce aid they would otherwise distribute to local districts.

An attempt was made to estimate similar statistical equations, using dollar values which were deflated by an estimate of cost-of-living differentials.* These are generally referred to as

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*In general, there are not good data on geographic differences in price levels. Most work on the consumer price index is done on a national basis, across time. Yet, some indication of price level differences can be derived from the budget studies by the Bureau of Labor Statistics. These budget levels were weighted for metropolitan and nonmetropolitan population levels for each state.

"real" dollar amounts rather than nominal; they reflect the real purchasing power of individuals in the various states since they are deflated by the relative prices in their area. These results are reported in detail in Tables A-4 through A-6. The results on real federal aid to SEAs are comparable to those in nominal terms -- approximately $2 of "real" state aid is distributed to school districts in response to each "real" dollar of federal aid. In 1973-74 the combined amount of real state and federal aid to LEAs is estimated to be $3.06 for every dollar of real aid from the federal government; in 1974-75 this estimate is $3.28. The stimulative effect is robust across the equations using nominal and real dollar values. The results on federal categorical and impact aid are also comparable for the equations using adjusted dollar values (see Table 1).

There are several other variables in the equation whose impact are of interest. In particular, the personal income level of individuals in the states is a positive determinant of state aid dollars to education, but statistically insignificant in all equations. In real dollar terms, $1,000 differentials in personal income per capita is associated with $60 - $80 dollar differences in per pupil state aid distributed to local school districts. The equations in nominal terms (A-1 through A-3) indicate that the relationship of income to state aid is somewhat reduced by the distribution of federal aid. In 1975-76 the differences in state aid associated with $1,000 differences in income equaled about $93 and for state plus federal aid, about $76 per pupil. This result

reflects the fact that the bulk of federal aid does concentrate on student populations from low income families.

Several variables were used to reflect the fiscal characteristics of the states; the level of income and sales tax revenue as a percentage of total tax revenues; tax revenues derived from corporate and individual income taxes and a dichotomous variable to reflect whether the state has imposed tax or spending limitations on school districts. Of these, only the composition variable is consistently significant in the equations. It indicates that the higher the percentage of taxes derived from these income tax sources, the higher are state aid payments to local schools. These tax revenues tend to be elastic -- responsive to growth in the states' economy or personal income -- and it may be easier for those states to keep pace with increases in demand for government services, such as education.

The limitation variable is only significant in the 1973-74 equation and then only at a 90 percent confidence level. Its value in that equation indicates those states with limitations on district spending, distribute approximately three percent less aid to school districts. The tendency for this variable to be insignificant is consistent with the results of an earlier study by ACIR which concludes that states with limits on local school budget authority do not have public school expenditures which are significantly different from states without limits (Wilken and Callahan, 1977).

The inclusion of the cost-of-living index and average teacher's salary variable is an effort to "account for" variations in expenditures on aid that may be cost related. It is extremely

difficult to appropriately measure the cost variations that theory would suggest affect the education spending decisions of the states. Theoretically, a relative price index should be included -- an index which describes the price of education services relative to the prices of all other goods. The use of average teacher's salary reflects relative quality as well as costs of teacher personnel in the states. Ideally, only relative costs of the similar quality personnel would be measured in such an index. In addition, average teacher salaries are highly correlated with the income variables and cost-of-living index in the present equations. All three variables are statistically insignificant in most equations.

In the equations explaining real revenues, another price variable is used. This variable is the product of a relative index (teacher salary index/cost-of-living index) and an enrollment to population ratio. This variable is an attempt to measure the relative price to taxpayers; although expenditures are measured on a per pupil basis, tax burdens are on an individual basis. The more pupils, the higher the total cost and tax burden per individual of a given level of expenditures per pupil. In a sense, this makes the "price" higher for the individual taxpayer. The statistical results are not improved in terms of the statistical significance of this price term or the income variable. The results on the federal aid variables, however, are slightly more stable for the three years studied.

Two socioeconomic variables used in the equations, percentage urban population and percentage population aged 65 and over, are significant and have the expected impact on real revenues per pupil

(A-4 through A-6). The urbanization variable is used in most studies of state/local expenditures and can be related to higher demands for public services, higher costs and/or higher incomes. In the present equations, it is positively related to higher expenditures on state aid per pupil for education. The percentage of the population over 65 indicates approximately $30 less in state, or state plus federal, aid per pupil is distributed for a one percent difference in this variable.

CONCLUSIONS AND POLICY IMPLICATIONS

The results of the present study reflect a "first glance" at the impact of federal dollars on state disbursements for aid to education. Until more refined data and further statistical testing is done, the conclusions drawn are very tentative. This study has identified, however, a set of variables that should be tested in future research and strengthened the expectation of a stimulative impact of federal aid on state aids to local districts.

A significant improvement can be made in future research simply by the use of Census data which, every five years, identifies state payments to local governments by its initial source of financing. Approximately 43 percent of federal aids to education in 1974 were estimated as funds to be "passed through" the state government to school districts (ACIR, 1977, p. 22, Table 14). It is possible that state aids to local districts are overstated in some tabulations of state and federal aids.

Other needed improvements are better estimates of cost differentials, better breakdowns of federal aids and further testing

of differences across groups of states, such as regional groups. Although a great deal of work has been done on cost variations across individual school districts (Chambers, 1978, and Killalea Associates, Inc., 1977), a state-by-state index has not been perfected. In addition, a reliable cost-of-living index representing the price of all other goods purchased is also needed for state analyses.

Although this study does break out impact aid from other federal programs which are distinctly different in nature, Gramlich suggests further breakdowns (1969, p. 590). Federal grants for new programs should be considered separate from those for which the state has pre-existing programs; federal programs which have very different matching requirements should be analyzed separate from those dissimilar in this respect. This sort of distinction would allow for a clearer hypothesis of the expected impact of these grants on state expenditures and intergovernmental aid. Another breakdown which would be informative is that of state general equalizing aid versus categorical aid to local school districts.

Finally, Barro identified one component of needed research as testing for differential state responses to changes in aid (1972, p. 20). Although the present study distinguished the average level of aid in states with spending limits versus those without and between states with GTB versus Foundation programs, it did not test for differences in the aid coefficient. That is, do states with foundation programs react to federal aid differently than those using guaranteed tax base programs? Additionally, are there regional differences similar to these found by Barro (1972, p. 11)? These questions should be investigated in future research.

There are three conclusions that can be tentatively drawn from the present results. These can then be placed in the context of policy questions concerning the federal role in school financing. These conclusions are:

- Federal categorical aid for specified purposes and populations is stimulative of additional state disbursement of general and categorical aid to local districts.
- Federal general aid, impact aid, allocated to school districts to replace lost tax revenues, affects state aid to districts in a negative manner. There is a reduction of state aid to LEAs as the federal government distributes this general aid.
- Other socioeconomic and demographic variables are important determinants in the amount of state aids distributed for school services. In particular, state income per capita is a positive determinant.

The first policy consideration noted earlier is the potential consolidation of the grants aimed at a variety of special student populations. These populations include students from low income poverty families, migrant families and/or bilingual students as well as the handicapped and students seeking vocational education. In addition to the complexity and rigidity of federal requirements placed on state and local priorities by these federal programs, there is a great deal of overlap in the populations served and programs implemented. Pupils frequently fit several categories at once; for instance, the "educationally deprived" of Title I and the "limited-English speaking" under the Bilingual Education Act. In order to comply with "supplement not supplant" rules, districts must

comply with the distinct regulations of each program, and it becomes difficult for administrators to coordinate the best program for a particular student.

On the other hand, targeting of very specific groups is a core part of the federal concern with populations which they felt state and local agencies were inadequately serving. A recent study by Feldstein (1979, pp. 131-146) contends that grants based on low income targets "can be regarded as most effective in reaching both the communities with the highest proportion of poverty students and the highest proportion of low-achievement students" (p. 145). Feldstein had compared block and matching grants, targeted to low income or low achievers. He concludes that, if the purpose of Title I is to aid districts with a high proportion of low income and achieving pupils, the only change that would make it more effective would be the use of a matching grant as opposed to the present use of lump-sum categorical grants.

This policy statement introduces the second area of concern for federal policy -- the aid structure itself. Should the structure of aid to state and local education agencies be general or categorical in nature? Given the present goal of the federal government to reach special groups believed to be high cost in terms of needed education resources, this research would contend that the present aid structure is effective. The focus of this study is to ascertain the impact on state disbursements of the present categorical aid structure. Regrettably, there is no history of general aid to states for education services. This analysis establishes the basis of a model for analyzing the impact of general aid to states. Similar analysis

of other state expenditure functions for which there is a history of federal aid may provide the means to predict state response to general aid for education. In addition, another set of response measures is needed -- those of the local school districts. With both estimates, a full description of the impact of federal aid on locally provided services would be obtained.

A recent study of state-local expenditures by Vogel (1977) confirms these thoughts on the structure of federal aid. General purpose aid often results in a "leak"; one dollar results in less than one dollar of added expenditures, whereas earmarked (categorical) dollars tend to be "stimulative," that is, each dollar attracts state plus local revenues which total more than a dollar of expenditures. Other research on school district behavior (Adams, 1979) indicates general school aid received from the states is used for property tax relief at a fairly high rate, despite the varying grant structure of the states.

If the goals of the federal government in financing education remain essentially as they are today, this and other research would indicate that the present categorical aid structure is appropriate and effective. The aid could be provided with more flexibility, but without moving to a general aid structure. A recent analysis of S. 1780, a bill proposing consolidation of federal programs, contends that adherents of general aid disagree with the goals of federal programs, not the effective aid structure for a given goal. They feel states should be able to establish their own priorities in developing education programs, and that the federal role should be different in nature than it is presently.

A potential new role of the federal government is its involvement in interstate and/or intrastate school finance reform. If the federal government should become involved in such a role, the aid would be general aid, but could be given in a matching or nonmatching manner. This "matching" is different from the matching ratios of existing categorical programs. This "matching" would be linked directly to the amount the state spends on reform; for every dollar spent by the state, the federal government provides some dollar amount of "matching." This matching could be the same across the states or could be varied with the wealth of the state. The response of states to this type of grant incentive, however, is a crucial question. Again, there is no history of such grant disbursements from the federal to state government for education. Recent research on school district response (Adams, 1979; Carroll, 1978) indicates the fiscal response to the lowered price of education services through matching provisions is very low. That is, a great deal of substitution of state for local funds takes place. This response, of course, is in the context of mixed goals of school finance reform and property tax relief as well as an increasing limitation of local leeway in education expenditures. For matching incentives to be effective for state government behavior, there needs to be flexibility in state spending, perhaps existing surpluses, and indications that the intent of the program is not to provide tax relief to the states.

This effort would require a great deal of monitoring, a great deal of new data and confrontation of the same school finance issues the states are addressing to achieve intrastate equity goals. A side

effect of such a program might be a drain of dollars away from state categorical programs, if the federal government made dollars spent on reform very attractive. A careful appraisal of the goals behind the federal role in financing schools is needed. The appropriate grant structure to achieve those goals could then be evaluated. In any evaluation, however, more information is needed on the state and state plus local response to federal grants-in-aid.

APPENDIX A

STATISTICAL EQUATIONS

Table A-1

ELASTICITIES* OF STATE AND STATE PLUS FEDERALLY FINANCED AID FOR EDUCATION, 1973-74**
UNADJUSTED DOLLAR VALUES***

	State Aid Per Pupil	State Plus Federal Aid Per Pupil
Personal Income ($/Capita)	0.764	0.543
	(1.322)	(1.292)
Federal Impact Aid ($/Pupil)	-0.168	-0.125
	(3.264)	(3.356)
Federal Categorical Aid to LEAs ($/Pupil)	0.240	0.184
	(1.422)	(1.494)
Federal Aid to SEAs ($/Pupil)	0.757	0.815
	(3.305)	(4.898)
Noneducation Federal Revenues ($/Capita)	0.174	0.123
	(1.077)	(1.048)
Percentage Income Taxes (Income Taxes/ Total Major Taxes)	0.709	0.442
	(2.678)	(2.294)
Income Tax Revenue ($/Capita)	0.010	0.006
	(1.024)	(0.771)
Sales Tax Revenue ($/Capita)	0.007	0.003
	(0.545)	(0.348)
Cost-of-Living Index	-1.342	-0.887
	(1.298)	(1.180)
Average Teacher Salary	0.691	0.532
	(1.315)	(1.392)
Percent Urban Population	0.744	0.532
	(3.154)	(3.102)
Percent Population Over 65	-0.009	0.023
	(0.036)	(0.135)
State Limitation on District Spending (Dummy Variable: 1 - Spending Limited; 0 - Otherwise)	-0.022	-0.016
	(1.786)	(1.784)
Intercept	-15.192	
R^2 =	.74	.78
S.E.E.	.2578	.1875
N =	50.000	50.000

*All variables are in log-form. The coefficients are measures of elasticities (the percentage change in revenues associated with a 1 percent change in the independent variable).

**T-statistics are in parentheses below the regression coefficients. Variables are statistically significant at the 90 percent level of confidence when the T-statistic is greater than 1.65 and at the 95 percent level when it exceeds 1.96.

***Dollar variables are unadjusted for differences in costs-of-living among the states.

Table A-2

ELASTICITIES* OF STATE AND STATE PLUS FEDERALLY FINANCED AID FOR EDUCATION, 1974-75**
UNADJUSTED DOLLAR VALUES***

	State Aid Per Pupil	State Plus Federal Plus Per Pupil
Personal Income ($/Capita)	0.926	0.628
	(1.506)	(1.459)
Federal Impact Aid ($/Pupil)	-0.109	-0.074
	(2.017)	(1.950)
Federal Categorical Aid to LEAs ($/Pupil)	0.182	0.152
	(1.360)	(1.619)
Federal Aid to SEAs ($/Pupil)	0.786	0.833
	(3.472)	(5.259)
Noneducation Federal Revenues ($/Capita)	0.116	0.062
	(0.527)	(0.404)
Percentage Income Taxes (Income Taxes/ Total Major Taxes)	0.599	0.285
	(2.059)	(1.399)
Income Tax Revenue ($/Capita)	0.027	0.016
	(2.565)	(2.150)
Sales Tax Revenue ($/Capita)	0.004	0.001
	(0.341)	(0.127)
Cost-of-Living Index	-2.495	-1.538
	(2.329)	(2.053)
Average Teacher Salary	0.950	0.707
	(1.579)	(1.682)
Percent Urban Population	0.651	0.400
	(1.992)	(1.747)
Percent Population Over 65	-0.339	0.227
	(1.303)	(1.249)
State Limitation on District Spending (Dummy Variable: 1 - Spending Limited; 0 - Otherwise)	-0.013	-0.008
	(0.990)	(0.862)
Intercept	-17.769	-11.745
R^2 =	.75	.79
S.E.E. =	.1923	.2749
N =	50.000	50.000

*All variables are in log-form. The coefficients are measures of elasticities (the percentage change in revenues associated with a 1 percent change in the independent variable).

**T-statistics are in parentheses below the regression coefficients. Variables are statistically significant at the 90 percent level of confidence when the T-statistic is greater than 1.65 and at the 95 percent when it exceeds 1.96.

***Dollar variables are unadjusted for differences in costs-of-living among the states.

Table A-3

ELASTICITIES* OF STATE AND STATE PLUS FEDERALLY FINANCED AID FOR EDUCATION, 1975-76**
UNADJUSTED DOLLAR TERMS***

	State Aid Per Pupil	State Plus Federal Aid Per Pupil
Personal Income ($/Capita)	0.858	0.529
	(1.192)	(1.054)
Federal Impact Aid ($/Pupil)	-0.066	-0.049
	(1.199)	(1.262)
Federal Categorical Aid to LEAs ($/Pupil)	0.449	0.323
	(2.227)	(2.299)
Federal Aid to SEAs ($/Pupil)	0.308	0.469
	(1.258)	(2.750)
Noneducation Federal Revenues ($/Capita)	-0.022	-0.022
	(0.107)	(0.151)
Percentage Income Taxes (Income Taxes/ Total Major Taxes)	0.476	0.309
	(2.216)	(2.062)
Income Tax Revenue ($/Capita)	0.009	0.004
	(0.845)	(0.580)
Sales Tax Revenue ($/Capita)	0.001	-0.002
	(0.085)	(0.179)
Cost-of-Living Index	0.099	0.241
	(0.087)	(0.303)
Average Teacher Salary	0.677	0.497
	(1.128)	(1.189)
Percent Urban Population	0.168	0.115
	(0.574)	(0.561)
Percent Population Over 65	-0.360	-0.242
	(1.359)	(1.312)
State Limitation on District Spending (Dummy Variable: 1 - Spending Limited; 0 - Otherwise)	0.012	0.009
	(0.858)	(0.892)
Intercept	-10.652	-6.170
R^2 =	.67	.74
S.E.E. =	.2805	.1956
N =	50.000	50.000

*All variables are in log-form. The coefficients are measures of elasticities (the percentage change in revenues associated with a 1 percent change in the independent variable).

**T-statistics are in parentheses below the regression coefficients. Variables are statistically significant at the 90 percent level of confidence when the T-statistic is greater than 1.65 and at the 95 percent when it exceeds 1.96.

***Dollar variables are unadjusted for differences in costs-of-living among the states.

Table A-4

ELASTICITIES* OF STATE AND STATE PLUS FEDERALLY FINANCED AID FOR EDUCATION, 1973-74**
ADJUSTED DOLLAR TERMS***

	State Aid Per Pupil	State Plus Federal Aid Per Pupil
Personal Income ($/Capita)	0.710	0.532
	(1.397)	(1.427)
Federal Impact Aid ($/Pupil)	-0.191	-0.141
	(3.986)	(4.022)
Federal Categorical Aid to LEAs ($/Pupil)	0.161	0.124
	(1.059)	(1.114)
Federal Aid to SEAs ($/Pupil)	0.699	0.756
	(2.905)	(4.282)
Percentage Income Taxes (Income Taxes/ Total Major Taxes)	0.716	0.427
	(3.234)	(2.627)
Relative Price Index	-0.002	0.019
	(0.005)	(0.007)
Percent Urban Population	0.770	0.553
	(3.505)	(3.431)
Percent Population Over 65	-0.424	-0.306
	(1.704)	(1.677)
State Aid Formula (Dummy Variable: 1 - GTB Program; 0 - Foundation Program)	0.003	0.001
	(0.281)	(0.136)
Intercept	-5.848	-3.649
R^2 =	.64	.69
S.E.E. =	.2753	.2020
N =	50.000	50.000

*All variables are in log-form. The coefficients are measures of elasticities (the percentage change in revenues associated with a 1 percent change in the independent variable).

**T-statistics are in parentheses below the regression coefficients. Variables are statistically significant at the 90 percent level of confidence when the T-statistic is greater than 1.65 and at the 95 percent when it exceeds 1.96.

***Dollar variables are adjusted for cost-of-living differences.

Table A-5

ELASTICITIES* OF STATE AND STATE PLUS FEDERALLY FINANCED AID FOR EDUCATION, 1974-75**
ADJUSTED DOLLAR TERMS***

	State Aid Per Pupil	State Plus Federal Aid Per Pupil
Personal Income ($/Capita)	0.805	0.591
	(1.519)	(1.627)
Federal Impact Aid ($/Pupil)	-0.161	-0.111
	(3.124)	(3.146)
Federal Categorical Aid to LEAs ($/Pupil)	0.217	0.155
	(1.961)	(2.040)
Federal Aid to SEAs ($/Pupil)	0.825	0.855
	(3.537)	(5.344)
Percentage Income Taxes (Income Taxes/ Total Major Taxes)	0.566	0.260
	(2.128)	(1.426)
Relative Price Index	0.341	0.260
	(0.664)	(0.737)
Percent Urban Population	0.756	0.502
	(2.980)	(2.881)
Percent Population Over 65	-0.563	-0.383
	(1.957)	(1.943)
State Aid Formula (Dummy Variable: 1 - GTB Program; 0 - Foundation Program)	-0.002	-0.002
	(0.151)	(0.331)
Intercept	-6.843	
R^2 =	.67	.73
S.E.E. =	.2954	.2026
N =	50.000	50.000

*All variables are in log-form. The coefficients are measures of elasticities (the percentage change in revenues associated with a 1 percent change in the independent variable).

**T-statistics are in parentheses below the regression coefficients. Variables are statistically significant at the 90 percent level of confidence when the T-statistic is greater than 1.65 and at the 95 percent when it exceeds 1.96.

***Dollar variables are adjusted for cost-of-living differences.

Table A-6

ELASTICITIES* OF STATE AND STATE PLUS FEDERALLY FINANCED AID FOR EDUCATION, 1975-76**
ADJUSTED DOLLAR TERMS***

	State Aid Per Pupil	State Plus Federal Aid Per Pupil
Personal Income ($/Capita)	0.603	0.409
	(1.061)	(1.031)
Federal Impact Aid ($/Pupil)	-0.094	-0.067
	(1.852)	(1.903)
Federal Categorical Aid to LEAs ($/Pupil)	0.326	0.232
	(1.929)	(1.964)
Federal Aid to SEAs ($/Pupil)	0.428	0.555
	(1.847)	(3.438)
Percentage Income Taxes (Income Taxes/ Total Major Taxes)	0.394	0.224
	(2.301)	(1.878)
Relative Price Index	0.675	0.491
	(1.387)	(1.446)
Percent Urban Population	0.429	0.304
	(1.934)	(1.963)
Percent Population Over 65	-0.444	-0.300
	(1.730)	(1.672)
State Aid Formula (Dummy Variable: 1 - GTB Program; 0 - Foundation Program)	0.005	0.003
	(0.580)	(0.441)
Intercept	-2.045	
R^2 =	.60	.67
S.E.E. =	.2800	.1985
N =	50.000	50.000

*All variables are in log-form. The coefficients are measures of elasticities (the percentage change in revenues associated with a 1 percent change in the independent variable).

**T-statistics are in parentheses below the regression coefficients. Variables are statistically significant at the 90 percent level of confidence when the T-statistic is greater than 1.65 and at the 95 percent when it exceeds 1.96.

***Dollar variables are adjusted for cost-of-living differences.

APPENDIX B

DATA SOURCES

The data used in the analysis were gathered primarily from Census and National Center for Education Statistics (NCES) publications. Data on state aid disbursements, federal aid receipts and enrollments were obtained from The Digest of Education Statistics (NCES), Washington, D.C. (U.S. Government Printing Office). Average teacher salaries were obtained from annual reports, Fall 1974 Statistics of Public Schools, Advance Report (NCES), Washington, D.C. (U.S. Government Printing Office). The source for data on the receipt of federal impact aid was Administration of PL 81-874 and 81-815 -- Annual Report, Table I: Public Law 81-874, Sections 2, 3 and 4: Net Entitlements and Current Expenditures of Local Education Agencies.

Several fiscal variables were derived from Census publications, State Government Finances in 1974-6, Series G175-No. 3 (U.S. Government Printing Office), Washington, D.C. These data include the amount of federal aid received by states for education and noneducation services, and the sales and income tax revenues of the state.

Socioeconomic variables were obtained from several Census publications. The percentage urban population and percentage of population age 65 and over are from the 1977 City and County Data Book, U.S. Bureau of the Census (U.S. Government Printing Office), Washington, D.C., 1978. Finally, per capita personal income and population data were obtained from the Survey of Current Business,

U.S. Department of Commerce (U.S. Government Printing Office), Washington, D.C.

REFERENCES

Adams, E. Kathleen. Analyses and Comparison of Fiscal Response in Four States, Report No. F79-13. Denver, Colo.: Education Commission of the States, December 1979.

Advisory Committee for Intergovernmental Relations (ACIR). The States and Intergovernmental Aids, A-59. Washington, D.C.: U.S. Government Printing Office, February 1977.

----------. Federal Grants: Their Effects on State-Local Expenditures, Employment Levels, Wage Rates, A-61. Washington, D.C.: U.S. Government Printing Office, February 1977.

Barro, Stephen M. "An Econometric Study of Public School Expenditure Variations Across States, 1951-1967." Paper presented at annual meeting of Econometric Society, December 1972.

----------. "The Urban Impacts of Federal Policies," vol. 3, Fiscal Conditions, R-2114-KF/HEW. Santa Monica, Calif.: Rand Corporation, April 1978.

Berke, Joel S. and Elizabeth J. Demarest. "The Federal Role in Education: Trends, Issues and Alternatives for the Future," Essay in Government in the Classroom: Dollar and Power in Education, ed. by Mary F. Williams. New York: Academy of Political Science (in press).

Brazer, Harvey E. "City Expenditures in the United States," National Bureau of Economic Research, Occasional Paper 65, 1959.

Carroll, Stephen J. The Search for Equity in School Finance: Michigan School District Response to a Guaranteed Tax Base, R-2393-NIE/HEW. Santa Monica, Calif.: Rand Corporation, March 1979.

Chambers, Jay G. "An Analysis of Education Costs Across Local School Districts in the State of Missouri, 1975-76," Papers in Education Finance, No. 7. Denver, Colo.: Education Finance Center, Education Commission of the States, February 1978.

Educational Testing Service, "Changing the Federal/State Partnership in Education: An Analysis of S.1780, The Reorganization and Consolidation Demonstration Project," prepared for the Senate Committee on Human Resources, January 1979.

Feldstein, Martin. "The Differential Add-on Grant: Title I and Local Education Spending," Journal of Human Resources, vol. XIII, no. 4. Fall 1978.

Feldstein, Martin S. and Bernard Friedman. "Alternative Approaches to Compensatory Education: Expenditure Effects," Public Finance Quarterly, vol. 7, no. 2. April 1979.

Gramlich, E.M. "The Effect of Federal Grants on State Local Expenditures: A Review of the Econometric Literature." Proceedings of the 62nd Annual Conference of the National Tax Association, 1969.

----------, "Alternative Federal Policies for Stimulating State and Local Expenditures: A Comparison of Their Effects," National Tax Journal, vol. XXI, no. 2. June 1968.

Hardy, H.M. "Budgetary Responses of Individual Governmental Units to Federal Grants," Public Finance Quarterly, vol. 4, no. 2. April 1976.

Killalea Associates, Inc. A Cost of Education Index: Methodological Considerations. A report submitted to the National Center for Education Statistics, 1977.

Osman, Jack W. "The Dual Impact of Federal Aid on State and Local Expenditures," National Tax Journal, vol. IX, no. 4. December 1966.

Palaich, Robert M. and Allan Odden. "Special Populations in Education: A Description of Finance and Organization in the United States." Denver, Colo.: Education Finance Center, Education Commission of the States, January 1979.

Vogel, Mary. Education Grant Consolidation: Its Potential Fiscal and Distributive Impacts. Santa Monica, Calif.: Rand Corporation, December 1977.

Wilken, William H. and John J. Callahan. "State Limitations on Local School Taxes and Spending: A Paper Tiger?" National Conference of State Legislatures, Aug. 29, 1977.